



VIRAL HEMORRHAGIC FEVERS

ARENAVIRUSES

The Arenaviridae are a family of viruses whose members generally are associated with rodent-transmitted disease in humans. Each virus usually is associated with a particular rodent host species in which it is maintained. Arenavirus infections are relatively common in humans in some areas of the world and can cause severe illnesses.

The virus particles are spherical and have an average diameter of 110 to 130 nanometers. All are enveloped in a lipid (fat) membrane. Viewed in cross-section, they show grainy particles that are ribosomes acquired from their host cells. It is this characteristic that gave them their name, derived from the Latin “arena,” which means sandy. Their genome, or genetic material, is composed of RNA only, and while their replication strategy is not completely understood, we know that new viral particles, called virions, are created by budding from the surface of their hosts’ cells.

These viruses are zoonotic, meaning that, in nature, they are found in animals. Each virus is associated with either one species or a few closely related rodents that constitute the virus’s natural reservoir. Tacaribe complex viruses generally are associated with New World rats and mice. The LCM/Lassa complex viruses are associated with Old World rats and mice. Taken together, these types of rodents are located across the greater proportion of the earth’s land mass, including Europe, Asia, Africa and the Americas. One notable exception is Tacaribe virus found in Trinidad, which was isolated from a bat.

The rodent hosts of arenaviruses are infected chronically with the viruses; however, the viruses do not appear to cause obvious illness in them. Some Old World arenaviruses appear to be passed from mother rodents to their offspring during pregnancy and thus remain in the rodent population generation after generation. Some New World arenaviruses are transmitted among adult rodents, likely through fighting and inflicting bites. Only a portion of the rodents in each host species is infected at any one time and, in many cases, only in a limited portion of the host’s geographical range. The viruses are shed into the environment in the urine or droppings of their infected hosts.

Human infection with arenaviruses is incidental to the natural cycle of the viruses and occurs when an individual comes into contact with the excretions or materials contaminated with the excretions of an infected rodent, such as through ingestion of contaminated food, or by direct contact of abraded or broken skin with rodent excrement. Infection also can occur by inhalation of tiny particles soiled with rodent urine or saliva (aerosol transmission). The types of incidental contact depend on the habits of both humans and rodents. For example, where the infected rodent species prefers a field habitat, human infection is associated with agricultural work. In areas where the rodent species’ habitat includes human homes or other buildings, infection occurs in domestic settings.

Some arenaviruses, such as Lassa and Machupo viruses, are associated with secondary person-to-person and nosocomial (health-care setting) transmission. This occurs when a person infected by exposure to the virus spreads the virus to other humans in a variety of ways. Person-to-person transmission is associated with direct contact with the blood or other excretions of infected individuals. Airborne transmission also has been reported in connection with certain viruses. Contact with objects contaminated with these materials, such as medical equipment, also is associated with transmission. In these situations, use of protective clothing and disinfection procedures (together called barrier nursing) help prevent further spread of illness.

Viral hemorrhagic fevers caused by viruses in the arenavirus family include Argentine hemorrhagic fever, Bolivian hemorrhagic fever, Lassa fever, lymphocytic choriomeningitis, Sabia-associated hemorrhagic fever and Venezuelan hemorrhagic fever.

For more information, call the North Dakota Department of Health at 701.328.2378.